



## DECLARATION OF DALE A. FLOOD

1. My name is Dale A. Flood and I reside at 3548 Falkirk Way, El Dorado Hills, California 95762. I am the inventor named in patent application No.10/716,505 filed on November 20, 2003. I also am the inventor named in U.S. patent No. 5,686,002.
2. I am employed by Tri Tool Inc., to which I have assigned the patent and the patent application identified above, and hold the title of Project Manager, Research and Development. My resume is attached, from which it will be evident that I have been engaged in the pipefitting/welding field for some 27 years, during which time I have supervised and taught welding, and have been involved in numerous welding projects of many kinds, with specialization in orbital pipe welding. I believe I am qualified to be considered as a person skilled in the field of welding technology.
3. I have reviewed the rejection of my application by the examiner dated March 7, 2006 and submit this declaration to offer factual information that I believe rebuts the examiner's position regarding the "obviousness" of my invention.
4. This invention arose out of a mystery I encountered while using the method described in patent 5,686,002 in which I am named a co-inventor and which is also assigned to Tri Tool Inc. As described in the patent, the method involves butt welding non-stainless (carbon based) steel using a bevel prep by introducing a small percentage of hydrogen gas in the shield gas of the basic GTAW welding process during the first root pass. I knew that using any hydrogen gas when welding carbon steel in a shield gas process was generally regarded as improper in the welding profession, but I was trying to solve a particular problem in obtaining an optimum amount of heat and arc force that would

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ensure a controlled fusion and penetration of the base metal without burn-through during the first root pass where the metal was thin at the bottom of the bevel. The theory underlying the patent, as has now proven to be correct and novel, was to introduce a minor amount of hydrogen in a GTAW carbon steel bevel prep weld zone to obtain increased activity and heat during the root pass, and then remove any residual trapped hydrogen in the solidified weld during a following weld pass, commonly termed "hot pass," after the root pass has been made.

5. While making the second weld pass over the solidified root weld, I observed numerous but apparently random occasions when a sudden explosive expulsion of molten weld metal from the weld pool occurred, accompanied by an audible report. Several such expulsions could be observed during a single weld. They were sufficiently violent to destroy the electrode and/or the gas lens I was using.

6. After eliminating all possible causes I could imagine, including normally encountered moisture contamination in the shield gas, impure weld tubing and piping, explosive compounds in the weld zone (solid fuel of some type and a solid oxidizer), a mixture of explosive gases, pockets of gaseous fuel in contact with solid oxidizer, and superheating of trapped gas pockets in the base weld metal, all requiring extensive experimentation and consultation with other persons skilled in the welding profession, I was at a loss to explain the phenomena I was observing or solve the problem.

7. I was particularly careful to avoid moisture contamination during the welding procedures I was using in order to preserve the weld quality, in accordance with recommended procedures for GTAW welding. I selected shield gases, hoses and equipment that would ensure shielding against moisture intrusion during welding in accordance with my new welding process.

8. I continued to conduct research towards identifying the cause of the molten metal expulsions and solving this problem. My research included review of available literature

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on the subject and discussions with peers in the welding profession. Much of my physical research centered on the possibility of the existence of trapped pockets of hydrogen gas and/or moisture created during the first root pass weld that were superheated during the second weld pass. I varied the speed of welding during the root pass in the hope that such pockets, if they were created, could be purged during the first weld. I was well aware that hydrogen or moisture caused porosity while welding carbon steel and I postulated that such porosity might be occurring and trapping hydrogen and/or moisture containing gas in open pores of the first weld zone which were then explosively expanding during the subsequent weld pass when it was intended to simply purge residual hydrogen gas from the root pass weld zone. The literature and my research up to this point were unfruitful.

9. I experimented with numerous weld gas hosing materials, and even used a solid metal piping system for the shield gases, theorizing that perhaps some form of contamination such as outgassing (gases diffusing through elastomer hose walls) having its source in the weld hoses was being introduced in the root or subsequent passes. During this experimentation I observed that there were no expulsions when I used the solid metal tubing for the weld gases or High "Extreme" Purity Teflon PFA 450 tubing or Thv Fluoropolymer (tetrafluoroethylene hexafluoropropylene vinylidene) tubing. From these experiments, I deduced that the weld hoses could be contributing in some manner to the expulsion events I was observing. I was still seeking the answer, however, to exactly what the contamination was and how it could be eliminated so that the expulsions could be avoided.

10. From the literature I researched and my discussions with peers in trying to identify the contaminant or other cause of the expulsions, I became aware that oxygen and moisture could diffuse through elastomer hoses to the extent that the quality of certain kinds of welds could be contaminated and adversely affected. I was still not convinced that avoiding the small amount of moisture that could permeate an elastomer weld hose suitable for GTAW welding could have any effect on reducing or eliminating the expulsions in my welding process. All the information available to me was only directed

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to weld quality, not weld metal expulsions of any kind and certainly not with any interaction with hydrogen or moisture entrapped in a carbon steel weld. As mentioned previously, welding professionals avoid using hydrogen in a shield gas in a carbon steel welding process in the first place due to the well-known and documented detrimental effect of hydrogen in such welds (embrittlement, porosity, low fatigue strength, etc.). It was thus understandable that information might not exist about how to avoid expulsions on a subsequent weld pass after a first pass in which hydrogen is introduced when welding non-stainless steels.

11. Pursuing my experimental observations further, I identified and selected weld hoses having a very, very low permeability to moisture and oxygen, in particular moisture, and experimented further with them while carrying out welding using the basic patented method in an attempt to eliminate or reduce the molten metal expulsion effect I was observing. Much to my satisfaction, I observed a reduction and elimination of the expulsion effect when I used welding gas hoses having very, very low moisture permeability coefficients, namely hoses having moisture permeability coefficients on the order of 275 or less, the lower the better. I then realized that the expulsion solution was at hand, even though the exact physical effect taking place in the weld zone was not completely understood.

12. My observations and experiments led me to the theorization that even a minute amount of moisture in the welding shield gas used in the first root weld pass could create pockets or pores containing free hydrogen gas or moisture that could react in a violent manner based on physical events not yet fully explainable. Under such a scenario, possibly minute quantities of oxygen diffusing through the elastomer weld gas hose and entering the gas stream would be sufficient to react with hydrogen to create moisture and possibly hydrogen filled pockets or pores when the weld solidified, and the pockets or pores would erupt violently upon being superheated and bursting through the molten weld metal during the second weld pass.

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13. The significant point is that while the literature and knowledge in the welding art could explain how moisture permeating a weld gas supply hose could affect weld quality, I was not concerned at all with weld quality. The welds I obtained using the method according to my and Porter's patent while using high quality and recommended elastomer weld hoses for GTAW welding equipment produced excellent quality welds. There was nothing in the literature I observed or information at my disposal that led the way to my solving the molten metal expulsion events I observed while making second weld passes after my first root pass using a shield gas mixture including a small amount of hydrogen. I observed no suggestion or teaching from any information at my disposal to use elastomer weld gas delivery hoses having a very, very low moisture permeability coefficient on the order of 275 or below to reduce or eliminate the expulsion events of the kind I observed. Nothing in the prior art I was aware of could offer any suggestion or explanation of why such expulsion events occurred, much less offer any suggestion or teaching as to how such events could be predicted or eliminated.

14. The examiner cites the Bhadha article from the Welding Journal in support of his rejection of certain claims of my patent application, contending that it would have been obvious to a person skilled in the art at the time I made my invention to use conventional practices to avoid contamination such as moisture while carrying out my welding process. Such conventional practices would have included avoiding moisture in accordance with the teachings of the Bhadha article, according to the examiner.

15. I cannot subscribe to this logic, as I already was using sufficient measures during the basic patented welding process to ensure good weld quality. I did not need to go further if weld quality was the issue. Weld quality was not the problem I was dealing with, it was the problem of violent explosive projection of molten weld metal from the weld pool during second pass heating of the first root pass weld I made using the basic patented method involving the use of hydrogen in the shield gas. There was no suggestion whatsoever from the Bhadha article or any other literature I reviewed that provided any solution to the expulsion problem.

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16. Notably, the Bhadha article is concerned with weld quality. In Bhadha, page 39, second column, Bhadha describes “Test Welds” resulting when impurities are removed according to his recommendations. The metal being welded is aluminum, and the test weld show elimination of weld porosity, and improvement in ductility, with fewer microcracks. It is clear that Bhadha was concerned with weld quality, not explaining or eliminating the molten metal expulsion events I was observing. Bhadha does not even mention hydrogen contamination at all, nor how preventing moisture contamination could affect a second pass weld over a first pass weld in which hydrogen and/or moisture laden pores could be imbedded. Thus Bhadha in my view totally fails to recognize that molten metal expulsion could result from moisture contamination during a second weld pass over a first solidified weld possibly containing hydrogen, which I eventually came to discover only by extensive experimentation and observations.

17. Weld quality was not an issue whatsoever in my quest to solve the expulsion problem. No one to my knowledge, including Bhadha, could explain how such phenomena could occur in an otherwise good quality weld meeting all applicable standards for carbon steel butt welds. I believe I alone invented a process for eliminating molten metal expulsion from a weld created in accordance with the basic patented method during a second weld pass by using elastomer weld gas delivery hose materials having a moisture permeability coefficient of less than 275. No one to my knowledge has attempted to solve any kind of metal expulsion problem where the presence of hydrogen gas and/or moisture laden pores in a weld zone is suspected, particularly in non-stainless steel welds such as carbon steel welds. Indeed, using hydrogen gas in a shield gas mixture for a carbon steel weld is highly unusual in the first place, and the hydrogen would be considered as a contaminant in and of itself. Eliminating the hydrogen by a second weld pass was the objective of the patented method and contamination with free hydrogen or moisture was not an issue with regard to the quality of the weld resulting from the basic patented process. Accordingly, I believe that my present invention is not

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obvious in any manner in view of the Bhadha publication or other prior art known to me  
at the time I made my invention.

18. I hereby declare under penalty of perjury that the foregoing is true and correct.

August 31, 2006

Date

Dale A. Flood

Dale A. Flood



DALE A. FLOOD  
3548 Falkirk Way  
El Dorado Hills, CA 95762

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## SUMMARY OF QUALIFICATIONS

Strengths in supervisory, leadership and training  
Administrative and organizational abilities  
Excellent communications skills  
Successful at meeting tight deadlines and achieving results  
Detail-oriented and computer literate  
Relates well at a variety of levels and supports good customer relations

## TECHNICAL MANAGEMENT EXPERIENCE

- Familiar with ASME Sec. 9, ANSI B31.1, AWS D9.1 and AWS D1.1.
- Oversee welding procedures, specifications and performance qualifications.
- In charge of rigging, fit-up and welding of main steam lines.
- Production welding on primary loop system at nuclear plants.
- Accountable for accuracy of joint configurations, fit-ups, preheats, purging and postweld heat treatments.
- Responsible for training programs for welders and for direction and evaluation of craft personnel on technical matters.
- Monitoring, documentation and sign-off inspections.
- Re-wrote contractor's postweld heat treatment procedures and attained near 100% success rate for weld treatments.
- Established and maintained computerized matrices of audited welding records for nuclear facilities.

2006	Elected District 22 Director and to the Board of Directors of the American Welding Society
2004	Elected Chairman of the American Welding Society Sacramento Valley Section
2001	Presented a Paper titled Orbital Weld Implementation and Technological Advancements in the Welding Industry to the United Association, Plumbers & Steam Fitters Local No. 157
2001 - 2003	Elected First Vice Chair and Education Committee Chair of the American Welding Society Sacramento Valley Section
1999 - Present	Nominated and accepted a position on the American Welding Society D10U subcommittee for international standard development related to orbital machine pipe welding
1999 - Present	Nominated and accepted a position on the American Welding Society D10 Piping and Tubing committee for international welding standard development
1998 - 2000	Elected Newsletter Editor of the American Welding Society Sacramento Valley Section
1998	Presented a Paper titled Successful Orbital Welding to the Tube & Pipe Association, International at the Pipe Fabricating '98 Conference
1995 - Present	Project Manager, R & D, Testing and Marketing of Orbital Weld Equipment – TRI TOOL INC., Rancho Cordova, CA
1994 - 95	Research & Development, Testing, Application Analysis & Marketing of Polysoude's Orbital Weld Equipment - MG Industries / Astro Arc Polysoude, Sun Valley, CA
1992 - 93	Welding Superintendent, Post Weld Heat Treat Supervisor & Training Coordinator CBI Services, Inc., for Niagara Mohawk Power Corp., Lycoming, NY at Nine Mile Point Units I & II



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El Dorado Hills, CA 95762

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1988 - 91      Welding Technician  
                  CBI Services, Inc., at Niagara Mohawk Power Corp., Lycoming, NY at Nine Mile Point Units I & II

1987 - 88      Welding Superintendent, Re-circulation Piping Replacement Project  
                  CBI Services, Inc., at Peach Bottom Atomic Station III, Delta, PA

1982 - 83      Foreman / Pipefitter / Welder  
                  Cherne Contracting, at Marble Hill Nuclear Station, New Washington, IN

## PIPE AND WELDING EXPERIENCE

- Design, layout, and installation of large and small bore pipe systems, hangers, and supports.
- Verify take-off sketches and fabrication of small bore piping assemblies.
- Radiographic quality welding on large/small bore pipes and hangers.
- Assist in PT and MT testing of weldments, Diametric F, Block, FFIP, and Video heads, hands-on and remote.
- Production / repair crewmember.

1993 - 94      Pipefitter / Welder  
                  Ebasco Constructors Inc., at Independence Power Project, Oswego, NY

1991            Pipefitter / Welder  
                  Freitag Weinhardt, at Eli Lilly Pharmaceuticals, Clinton, IN

1986 - 87      Pipefitter / Welder

& 1985 - 86    Phillips Getschow, at Braidwood Nuclear Station and Dresden Nuclear Station, Joliet, IL

1985            Pipefitter / Welder  
                  Frank Strahl & Sons Inc., at Olin Corporation, Covington, IN

1984 - 85      Pipefitter / Welder  
                  ITT Grinell, at Nine Mile II Nuclear Station, Oswego, NY

1979 - 82      Pipefitter / Welder  
                  National Valve and Manufacturing, at Merom Power Plant, Merom, IN

## EDUCATION

1993            Computer classes in DOS, Microsoft Windows, Excel and Word

1989            Welding and QA Supervisor School, CBI Services, Inc. Houston, TX  
*2nd in class with score of 97.7%*  
*Extensive training concerning ASME, ANSI, & API codes*

1980            UANCA Welding School, Terre Haute, IN  
*AWS certification using SMAW, GTAW, Diametric automatics, MIG*  
*and other processes*

1973            International Bible College, San Antonio, TX

1973            Avon High School, Avon, IN graduate  
*Placed 4th in International Science Fair.*

## REFERENCES AVAILABLE UPON REQUEST



## DECLARATION OF WILLIAM E. SANDFORD

1. My name is William E. Sandford and I reside at 2900 Larkspur Lane, Camino, California 95709. I am presently retired, but up to my retirement on June 2, 2006, I was employed by Tri Tool, Inc., a California corporation located at 3806 Security Park Drive, Rancho Cordova, California 95742, with the title of Technical Director and Systems Concept Engineer. I am still engaged by Tri Tool as a consultant.
2. I was a co-worker with Mr. Dale A. Flood, the inventor named in U.S. patent application serial number 10/716,505 filed on November 20, 2003. I understand that this application is owned by Tri Tool Inc. I have read the application and I have also read the rejection of the application by the examiner in charge of the case based on the examiner's interpretation of the teachings of an article in Welding Journal by Paul M. Bhadha. I have also read Mr. Flood's declaration to be submitted in his patent application in rebuttal of the rejection. I am also familiar with Mr. Flood's and Mr. Porter's patent No. 5,686,002 which describes the basic welding method during implementation of which the expulsions were observed by Mr. Flood from time to time during the second weld pass.
3. My resume reflecting my experience up to my retirement from Tri Tool Inc. is attached from which it will be observed that I have a Bachelor of Science degree in chemical engineering (1957) and have 49 years experience in design applications and manufacturing engineering, including research, development, design and production of pipe cutting and beveling machines used in the pipe fitting and welding field. In my past experience, I was also responsible for the management of engineering personnel responsible for pipe cutting tools and automatic orbital pipe welding equipment.

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4. I believe I am qualified as a skilled person in the field of pipe preparation and welding technology, including GTAW welding.

5. I consulted with Mr. Flood while he was observing the random occurrence of explosive expulsions of molten metal during some of the second pass welds he made using his method as described in patent No. 5,686,002. He was seeking an explanation of the phenomena he was observing and hoped I might be able to provide a theory that would provide such an explanation or a solution to the problem.

6. Considering that the welding system was a well proven system capable of producing high quality GTAW welds using 100% inert (typically Argon or Helium) shield gas, I was unable to provide a theory that would explain the phenomena except in terms of some form of contamination/reaction resulting from using Hydrogen in the shield gas. Some possible causes of the random events considered included, absorption of Hydrogen by the inner wall of the gas tubing followed by outgassing contaminated gas, aspiration leaks, etc. The possibility of the need for hoses with lower gas/water vapor permeability values to allow use of Hydrogen in the shield gas was not considered. I was unaware of any information that could definitely explain the exact mechanism for the expulsions, nor any information indicating that low permeability hose would prevent expulsions. Elastomer hoses that are quite flexible are and have been used in weld heads for practical design consideration reasons related to automatic GTAW weld heads function. The torch body must move relative to the workpiece, usually a pipe, and must follow the cross seam oscillations and vertical travel motions. Therefore very flexible elastomer hose/tubing is being used for shield gas delivery systems on well documented system that deliver excellent quality GTAW welds. Ultra low permeability hose materials tend not to be as flexible as the elastomer hose with slightly higher permeability values which probably explains why they have not been adopted in the past.

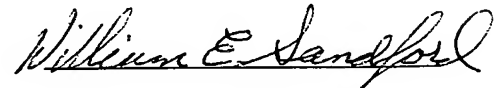
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7. It is my belief that Mr. Flood's theory that minute amounts of water vapor or other gaseous molecules diffused through elastomer weld hoses delivering shield gases to a GTAW weld zone when hydrogen/inert gas mixture is used with a non-stainless steel weld process can create hydrogen or water vapor pockets that erupt violently on a second weld pass is a plausible explanation of the weld metal expulsions on a second weld pass, and his discovery of solving the problem by selecting elastomer shield gas delivery hoses having very low moisture permeability coefficients below 275 would not be obvious to a person skilled in GTAW welding technology. While the literature teaches using low moisture permeable hoses for maintaining weld quality, I do not observe within the literature or general knowledge in the field any awareness that selecting such hoses could prevent explosive expulsion of molten metal during a second pass weld made according to Mr. Flood's welding method described in patent No. 5,686,002. Mr. Flood in my view had an extraordinary number of variables to investigate in solving the expulsion problem, and his discovery of the up-to-then unknown effect of minute gas or vapor permeation in elastomer shield gas delivery hoses on second pass welds made over a first pass weld where hydrogen gas is used as a shield gas during a first root pass weld on carbon-based steels using GTAW equipment and his solution to the problem involving the use of elastomer hoses having very low moisture permeability coefficients less than 275 is novel and was not obvious to me.

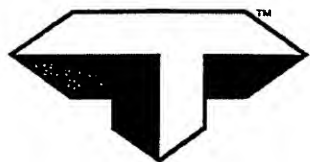
8. I hereby declare under penalty of perjury that the foregoing is true and correct.

1 SEPTEMBER, 2006

Date



William E. Sandford



# TRI TOOL INC.

3806 Security Park Drive • Rancho Cordova, CA 95742-6990 U.S.A. • (888)TRI TOOL • (916)351-0144 • Fax (916)351-0372  
www.tritool.com • customer.service@tritool.com



**RESUME'**  
**of**  
**WILLIAM SANDFORD**  
**TECHNICAL DIRECTOR AND SYSTEMS CONCEPT ENGINEER**

Forty five years experience in design, applications and manufacturing engineering; extensive R & D, product design and manufacturing management; supervision of testing, engineering drafting and assembly; design and development program management of high production machinery, ordnance products, pipe cutting and pipe beveling machines.

**ACADEMIC BACKGROUND**

Bachelor of Science, Chemical Engineering, Michigan State University, Post Graduate courses related to compressible fluid flow and dynamic analysis, UCLA.

**WORK EXPERIENCE**

**TRI TOOL INC. - Technical Director and Systems Concept Engineer**

Responsible for content of technical publications, technical input to engineering and production problems, analysis of customer requirements and development of new product concepts.

**- Operations Manager**

Responsible for Manufacturing, R & D / Product Development, Technical Analysis, Proposal Writing and Project Management.

**- Vice President of Manufacturing**

Management of manufacturing operations and technical advisor to engineering.

**DIMETRICS INC. - Manager of Product Engineering**

Management of design engineering personnel responsible for pipe cutting tools and automatic orbital welding equipment.

**DE GORGIO CORPORATION - Senior Scientist**

Combustion research for wood/wax fireplace log products.

**WHITTAKER CORPORATION, BERMITE DIVISION**

**-Manager of R & D**

Department manager of R & D engineering, Program Engineering Managers and Production Liaison Engineering.

**-Manager of Propulsion Systems**

**-Program Manager**

**-Chemical Development Group**

**MARQUARDT CORPORATION - Associate Engineer - Design, testing and dynamic analysis on BOMARC Ramjet Engines within the Fuel Control Systems Group.**



## DECLARATION OF MICHAEL PORTER

1. My name is Michael Porter and I reside at 2581 Raleigh Way, El Dorado Hills, California, 95762. I am employed by Tri Tool Inc., a Nevada corporation with main offices located at 3806 Security Park Drive, Rancho Cordova, California 95742, where I have previously held the titles of Sales Manager and Sanitary Tubing/Pipe Welding Specialist, and am currently the Director of Training and Weld Systems Manager.
2. My Summary Resume is attached, showing over 30 years of experience in the welding field, including instructing and supervising welding personnel. I believe I am qualified as a person skilled in the welding field.
3. I am a co-inventor with Mr. Dale Flood named in U.S. patent No. 5,686,002 which describes a method for butt-welding non-stainless steel (i.e., carbon-based steels) using a bevel prep and a multi-pass GTAW procedure wherein a mixture of 95/5 inert gas/hydrogen is used to shield a root pass and then inert gas alone is used in a subsequent second weld pass to effectively purge the hydrogen from the root pass weld to avoid adverse effects of hydrogen in the weld zone.
4. I have read Mr. Flood's patent application No. 10/716,505 for "Process For Welding" and a rejection of the application by the patent examiner in view of our earlier patent 5,686,002 and an article by Bhadha entitled "How Weld Hose Materials Affect Shielding Gas Quality" in the July, 1999 issue of Welding Journal.
5. When Mr. Flood first encountered the occasional molten weld metal expulsion from the second pass weld zone when using our patented method, he consulted with me to inquire if I knew of any theory that would explain what could be causing such an effect.

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6. In my experience, I had never encountered such an expulsion from a weld zone during an automatic GTAW process on carbon-based steel (non-stainless) where hydrogen was used in the shield gas on a first root pass, and could not provide a definite explanation of the cause of the expulsions. The welds obtained using our patented method were of good quality and passed all standards for such welds. The equipment used by Mr. Flood in making the welds according to our patented method met all standards for shielding and low moisture contamination, in my view. As an experienced welder, I was aware of the need to avoid moisture in the weld zone during certain welding procedures in general, particularly GTAW welding of carbon based steel, as is taught in welding classes in vocational technical schools and is known to professional welders. Moisture in the weld gas in such procedures could affect weld quality. In my experience, I did not appreciate that a very small amount of moisture that might diffuse through the walls of some elastomer gas delivery hoses (called "outgassing" in the field) could cause the expulsions observed by Mr. Flood although I did advise him that the gas supply hoses could be a candidate for study in view of known outgassing of such hoses that could affect weld quality under certain circumstances. The effect of minute amounts of moisture outgassing in elastomer hoses when hydrogen is present in the shield gases during the first root weld pass on carbon-based metal was unknown at the time in the field, in my view, and any such outgassing would not readily explain the violent molten metal expulsions observed by Mr. Flood during a second weld pass over the root pass.

7. In the Bhadha article, it seems to me that the author is discussing weld quality, not metal expulsion effects that are not related to weld quality. The article is from 1999 and the sensitivity to moisture contamination in certain kinds of welds is well documented. While diffusion of very small amounts of moisture and oxygen through the walls of elastomeric weld gas delivery hoses can occur, I did not expect that such small amounts could be a cause of explosive reaction in a second pass GTAW weld where hydrogen was used in the shield gas during a first weld pass. Neither the Bhadha article nor any other information I am aware of recognizes or discusses such a problem. It seemed to me that

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the expulsion effect was unique to our basic welding method and no information existed on this subject.

8. In my view, Mr. Flood's solution to the problem of weld metal expulsion while making a second pass weld while carrying out our patented method, namely using elastomer shield gas supply hoses having a moisture permeability coefficient of 275 or lower in combination with our basic weld method is new and is not obvious to a skilled welder.

10. I hereby declare under penalty of perjury that the foregoing is true and correct.

8-31-06

Date

Michael R Porter

Michael Porter





**MIKE PORTER**  
**WELDING DEPARTMENT MANAGER**  
**SUMMARY RESUME**

Mike has 30 years experience in FCAW, GTAW, GMAW and SMAW manual and automatic pipe welding processes as a Welder, Training Instructor and Construction Welding Superintendent. His hands on experience gives him an excellent knowledge of how the weld preparation machining, fit-up procedures and welding process interact to affect productivity and weld quality. Welding and consulting work at many sites, on many alloys, and in all types of industries using manual and automatic pipe welding processes provide Mike with the background to solve virtually any welding problem.

**Positions:**

June 2, 1992 to Present

Tri Tool Inc. Sales Manager, Sanitary Tubing/Pipe Welding Specialist, Training Coordinator, Director of Training and Weld Systems Manager

1990

Freitag-Weinhardt, Inc. Welding and Fabrication Superintendent

1977 to 1985

Welding Instructor for the United Association of Plumber & Steam Fitters, National Constructors Association Local 157 Training Center

(1976 - Graduated from United Association Instructors Training Program at Purdue University)

1978

Instructor of Journeyman and Apprentice Training Program Plumber & Steam Fitters Local 157

1973

Welding & Theory Instructor - Plumber & Steam Fitters Local 157

**Member:**

United Association of Plumbers & Steamfitters Local 157 since 1973.  
American Welding Society since 1978